# Anatomy of UL- Hand

**By DR/Aliaa omar El hady**

Anatomy of UL- Hand & wrist (1)

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الجزئية دى مهمة جدا جدا والكثيرون يهملونها ولكنها هامة خاصة فى حالات الاعوجاج الناتج من الروماتويد .... من يعرف الاناتومى جيدا يسهل عليه معرفة الباثولوجى

Palmar fascial complex

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The palmar fascia is a three-dimensional ligamentous system composed
of longitudinal, transverse and vertical fibres

ركزوا على الصور

Longitudinal fibre system

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-They represent the phylogenetically degenerated MPJ flexor.

-They run distally from the palmaris longus tendon or the flexor retinaculum of the wrist across the whole width of the central third of the palm, producing four well-defined longitudinal bundles to the index, middle, ring and little fingers.

-A less well-defined bundle passes to the thumb.

-Distal to the transverse fibres of the palmar aponeurosis the longitudinal fibres pass in three layers.

1)-The most superficial longitudinal fibres (layer 1) are inserted superficially into the skin of the distal palm between the distal palmar crease and the proximal digital crease.
-Some superficial fibres pass distally into the palmar midline of the digit.

2)-Deeper longitudinal fibres (layer 2) pass deep to the natatory ligament and neurovascular bundles into the apex of the web space skin and into the fingers themselves where they are continuous with Cleland's ligaments and the lateral digital sheet. These are known as the spiral bands of Gosset.

3)-Deeper still, the longitudinal fibres in layer 3 perforate the deep transverse metacarpal ligament to pass around the sides of the MCP jt and attach to the metacarpal bone and proximal phalanx, and extensor tendon.

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Transverse fibre system:

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-The transverse fibre system consists of the natatory ligament (also known as superficial transverse metacarpal ligament), the transverse fibres of the palmar aponeurosis (also known as fibres of Skoog), and the transverse metacarpal ligament (also known as the deep transverse metacarpal ligament).

-The fibres of the natatory ligament (superfi cial transverse metacarpal ligament) cross the apex of the web skin and extend into the digit to blend with the lateral digital sheet, thus limiting the spreading of the skin of the distal palm and the separation of the adjacent fingers. The natatory ligament in the first web is called the distal commissural ligament.

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Transverse fibres of the palmar aponeurosis

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-The transverse fibres of the palmar aponeurosis (fibres of Skoog) lie more proximally than the natatory fibres and represent the deepest layer of the palmar fascia.

-They lie proximal to the distal palmar crease in a band approximately 2 cm wide, and connect the anterior fibres of the flexor tendon sheaths with one another and to the fasciae over the thenar and hypothenar muscles groups.

-The extension to the first ray is called the proximal commissural ligament.

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Transverse metacarpal ligament

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-The strong transverse fibres of the transverse metacarpal ligament are
deep to the palmar aponeurosis and flexor sheaths.

-They connect the metacarpal heads of the index to little fingers by their attachment with the volar plates.

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Vertical fibre system

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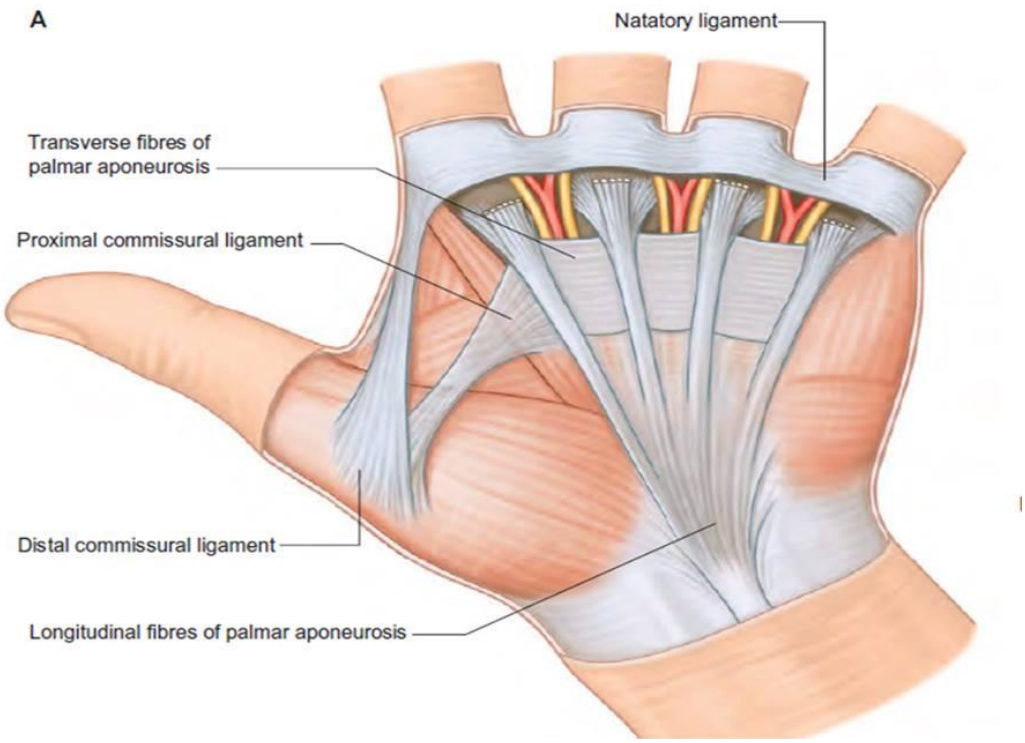
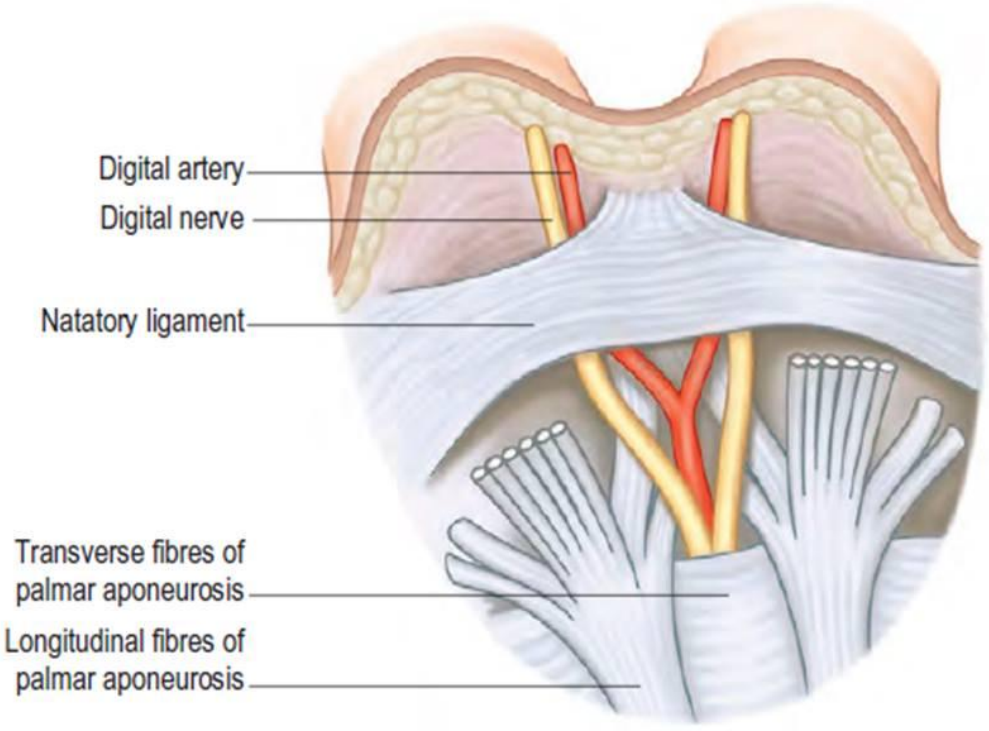
-The vertical fibres are more delicate, and pass from the dermis, between
the longitudinal and transverse fibres, to the fibrous flexor sheaths
and the metacarpal bones.

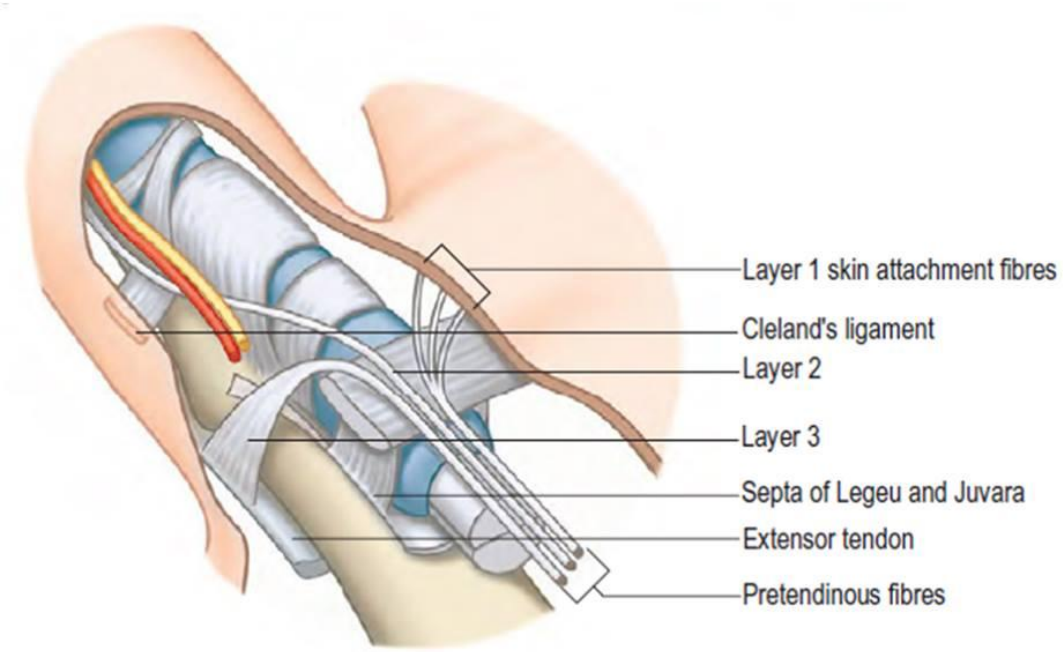
-They are concentrated on either side of the palmar skin creases as well as the thenar and hypothenar eminences.

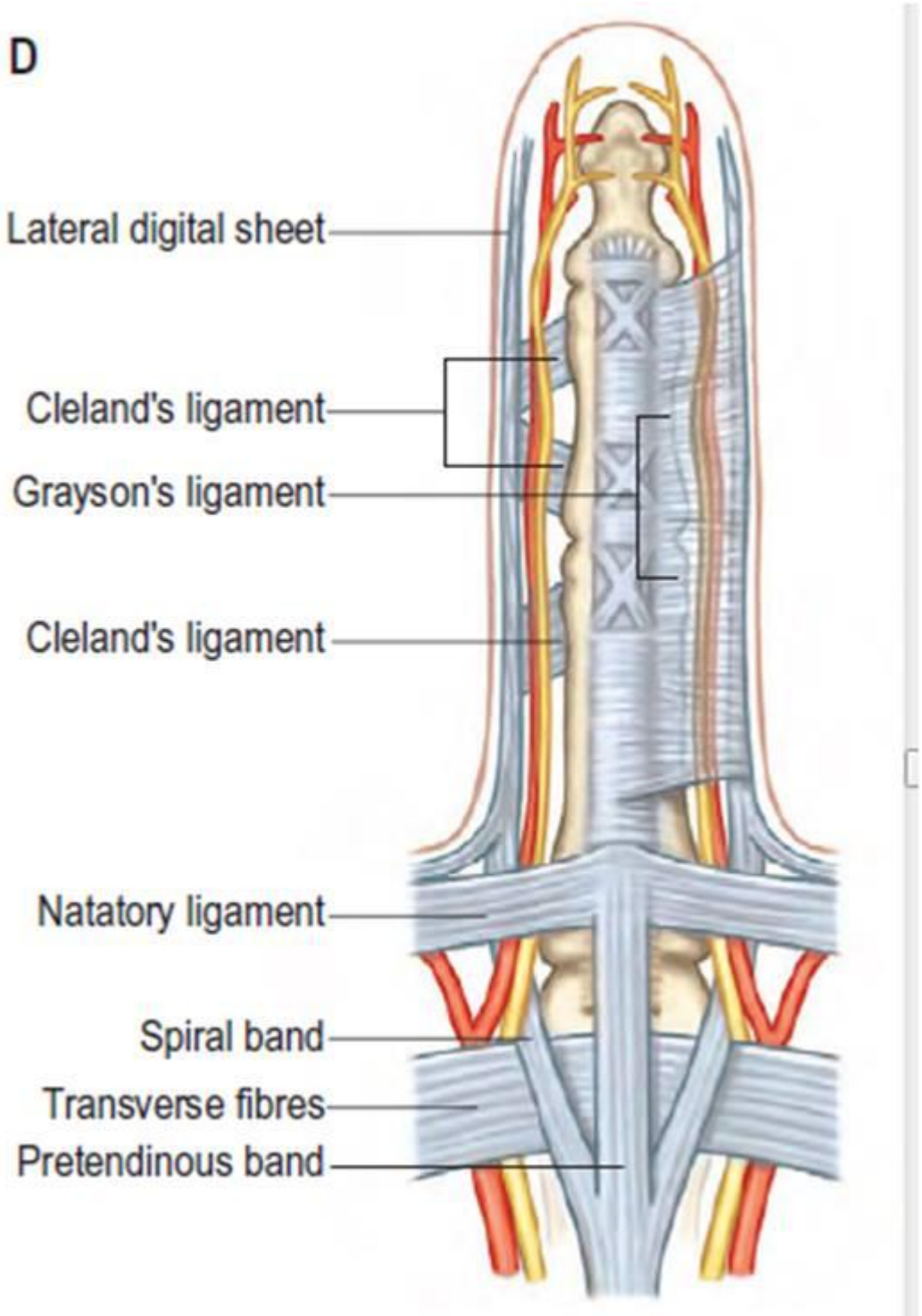
-A series of vertical septa lie deep to the transverse fibres of the palmar
aponeurosis, and connect it to the underlying deep transverse ligament.

-They provide compartments which contain the flexor tendons and the
lumbricals and neurovascular bundles.

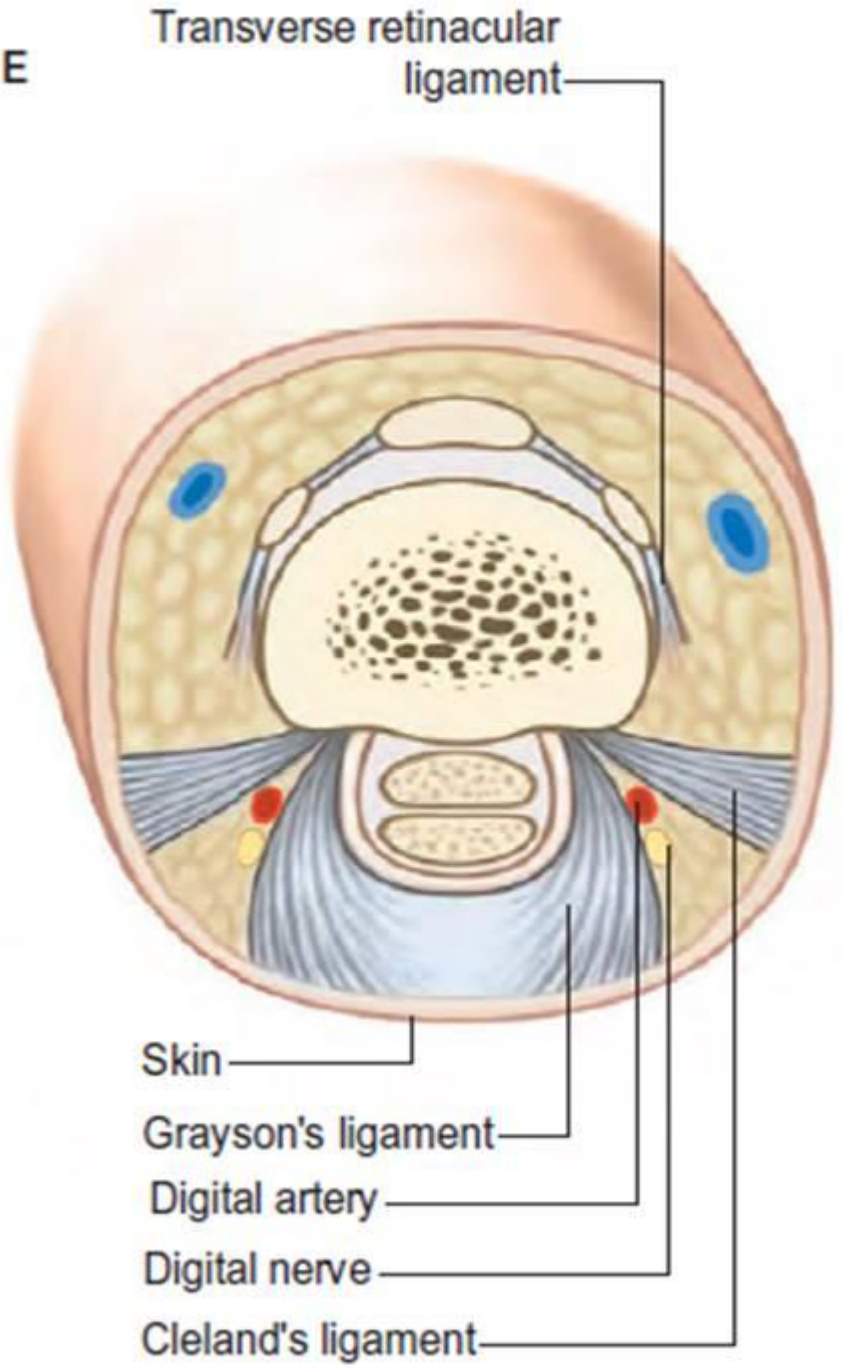

A
Natatory ligament
Transverse fibres of palmar aponeurosis
Proximal commissural ligament
Distal commissural ligament
Longitudinal fibres of palmar aponeurosis


Digital artery
Digital nerve
Natatory ligament
Transverse fibres of palmar aponeurosis
Longitudinal fibres of palmar aponeurosis


Layer 1 skin attachment fibres
Cleland's ligament
Layer 2
Layer 3
Septa of Legeu and Juvara
Extensor tendon
Pretendinous fibres


D
Lateral digital sheet
Cleland's ligament
Grayson's ligament
Cleland's ligament
Natatory ligament
Spiral band
Transverse fibres
Pretendinous band

E


Transverse retinacular ligament
Skin
Grayson's ligament
Digital artery
Digital nerve
Cleland's ligament

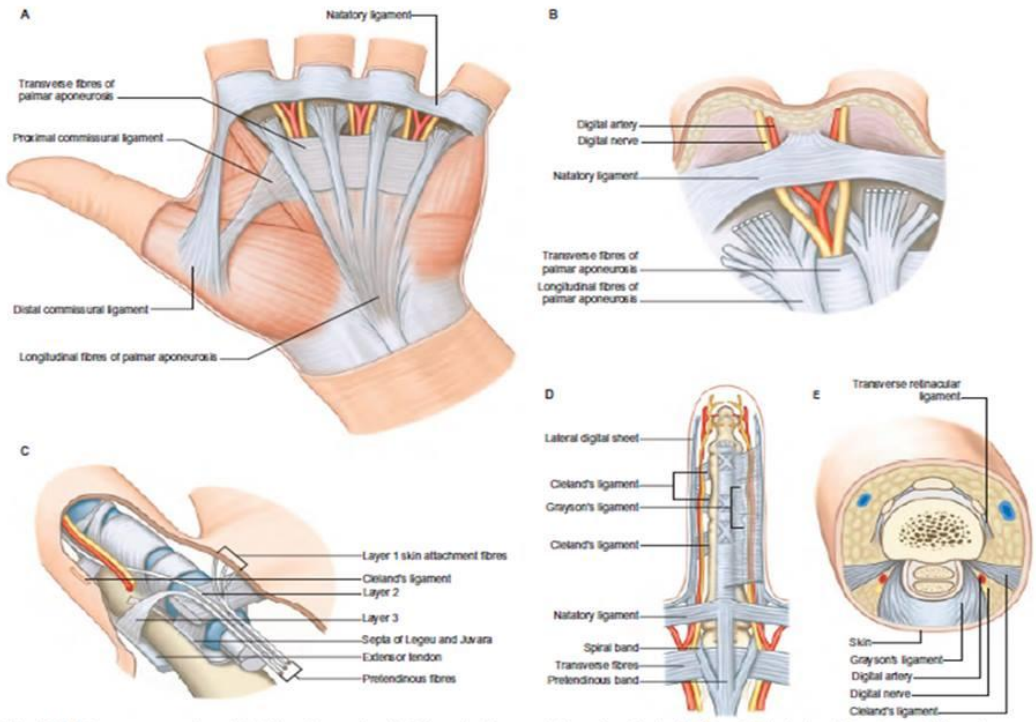



**Fig. 50.4** Palmar aponeurosis and distal fascial complex. **A**, Schematic diagram of the palmar fascia. **B**, More detailed view of structures at the web space. **C**, Fate of the distal longitudinal fibres. **D**, **E**, Normal digital fascia.

Anatomy of UL- Hand & wrist (2)

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Dupuytren’s disease

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Dupuytren’s disease (contracture) is a progressive condition of uncertain
aetiology resulting from fibrous contracture of the palmar aponeurosis:
the little and ring fingers are especially affected.

Longitudinal thickening in the palm produces cords and thickened nodules
which can progress to flexion deformities of the metacarpophalangeal
and proximal interphalangeal joints of the affected fingers.

The palmar aponeurosis only extends as far as the sides of the middle phalanx,therefore the distal interphalangeal joint is uncommonly involved.
Indeed, in advanced cases, the distal interphalangeal joint can be hyperextended as the distal phalanx is pushed backwards against

the
palm.

The pattern of fascial involvement in this condition can be complex.

For example, the normal anatomical position of the digital nerves
and arteries may be distorted because they are often displaced medially.

Since surgical treatment involves excising the affected area of palmar fascia, the digital nerves and arteries may be at risk in this
procedure.

A similar contracture may affect the plantar fascia in the sole of the
foot.

Anatomy of UL- Hand & wrist (3)

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BONE

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-The skeleton of the hand consists of the carpus, metacarpus and the
phalanges.

-In the following description, proximal and distal are used in preference to superior and inferior, and palmar and dorsal, rather than anterior and posterior.

CARPAL BONES

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The carpus contains eight bones: four each in proximal and distal rows.

- In radial (lateral) to ulnar (medial) order, the scaphoid, lunate, triquetrum and pisiform make up the proximal row, and the trapezium, trapezoid, capitate and hamate make up the distal row.

-The pisiform articulates with the palmar surface of the triquetrum,
and is thus separated from the other carpal bones, all of which articulate
with their neighbours.

-The other three proximal bones form an arch which is proximally convex, and which articulates with the radius and articular disc of the distal radio-ulnar joint.

-The concavity of the arch is a distal recess embracing, proximally, the projecting aspects of the capitate and hamate.

-The two rows of carpal bones are thus mutually and firmly adapted without any loss of movement.

-The dorsal carpal surface is convex.

-The palmar surface forms a deeply concave carpal groove, accentuated by the palmar projection of the radial (lateral) and ulnar (medial) borders.

-The ulnar projection is formed by the pisiform and the hamulus (hook), an unciform palmar process of the hamate.

-The pisiform is at the proximal border of the hypothenar eminence, on the ulnar side of the palm, and it is easily felt in front of the triquetrum.

-The hamulus is concave in a radial direction,its tip is palpable 2.5 cm distal to the pisiform, in line with the radial border of the ring finger.

-The superficial division of the ulnar nerve can be rolled on it.

-The radial border of the carpal groove is formed by the tubercles of the scaphoid and trapezium.

-The tubercle of the trapezium is a vertically rounded ridge on the anterior
surface of the bone, slightly hollow medially and just distal and radial
to the scaphoid tubercle: it is difficult to palpate. (Both the scaphoid
and trapezium may be grasped individually, and moved passively, by

firm pressure between an opposed index finger and thumb applied to
the palmar surface and ‘anatomical snuff-box’ simultaneously.)

-The carpal groove is made into an osseofibrous carpal tunnel by a fibrous
retinaculum attached to its margins.

-The tunnel carries flexor tendons and the median nerve into the hand. The retinaculum strengthens the carpus and augments flexor efficiency.

-Radiocarpal, intercarpal and carpometacarpal ligaments are attached to the palmar and dorsal surfaces of all of the carpal bones, except the triquetrum and pisiform.

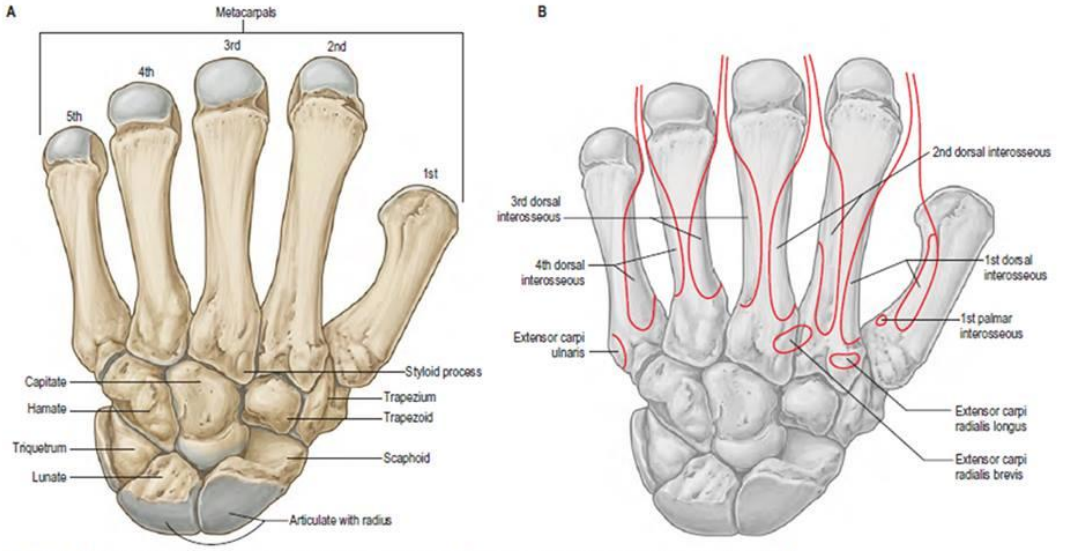


**Fig. 50.6** **A**, Dorsal aspect of the carpal and metacarpal bones of the left hand. Muscle attachments are shown in **B**.

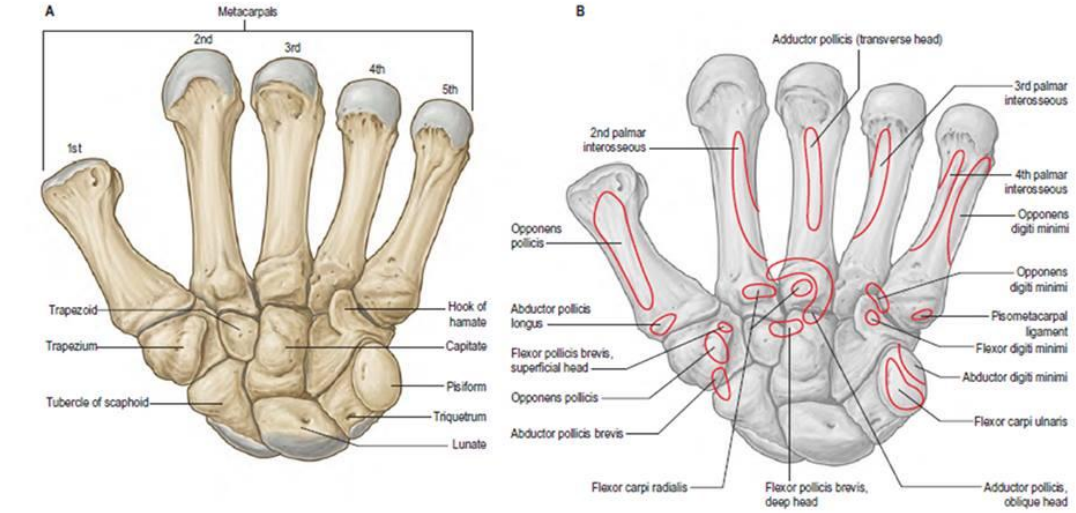


**Fig. 50.5** **A**, Palmar aspect of the carpal and metacarpal bones of the left hand. Muscle attachments, except for the dorsal interossei, are shown in **B**.

Anatomy of UL- Hand & wrist (4)

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BONE

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METACARPALS

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-The metacarpus consists of five metacarpal bones, conventionally numbered in radio-ulnar order.

-These are miniature long bones, with a distal head, shaft and expanded base.

-The rounded heads articulate with the proximal phalanges.

-Their articular surfaces are convex, although less so transversely, and extend further on the palmar surfaces, especially at their margins.

-The knuckles are produced by the metacarpal heads.

-The metacarpal bases articulate with the distal carpal row and with each
other, except the first and second.

-The shafts have longitudinally concave palmar surfaces, which form hollows for the palmar muscles.

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PHALANGES:

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-There are 14 phalanges, three in each finger, two in the thumb.

-Each has a head, shaft and proximal base.

-The shaft tapers distally, its dorsal surface transversely convex.

-The palmar surface is transversely flat but gently concave anteriorly in its long axis.

-Articular ligaments and numerous muscles are attached to the phalanges.

-A corresponding tendon of flexor digitorum profundus and, on its dorsal surface, extensor digitorum, are attached to the base of each distal phalanx on its palmar surface.

-A tendon of flexor digitorum superficialis and its fibrous sheath are attached to the sides of a middle phalanx, and a part of extensor digitorum is attached to the base dorsally.

-A fibrous flexor sheath is attached to the sides of a proximal phalanx, part of the corresponding dorsal interosseous is attached to its base laterally, and another dorsal interosseous is attached medially.

-The phalanges of the little finger and the thumb differ.

-Abductor and flexor digiti minimi are attached to the medial side of the base of the proximal phalanx of the little finger.

-The tendon of extensor pollicis brevis and the oblique head of adductor pollicis (dorsally), and the oblique and transverse heads of adductor pollicis, sometimes conjoined with the first palmar interosseous (medially), are attached to the base of the proximal pollicial phalanx.

**Fig. 50.10** Radiograph of a hand at 11 years (female), dorsopalmar projection. Note the maturing shapes of all the ossifications previously seen in **Figs 50.8** and **50.9**, with the addition of the pisiform.

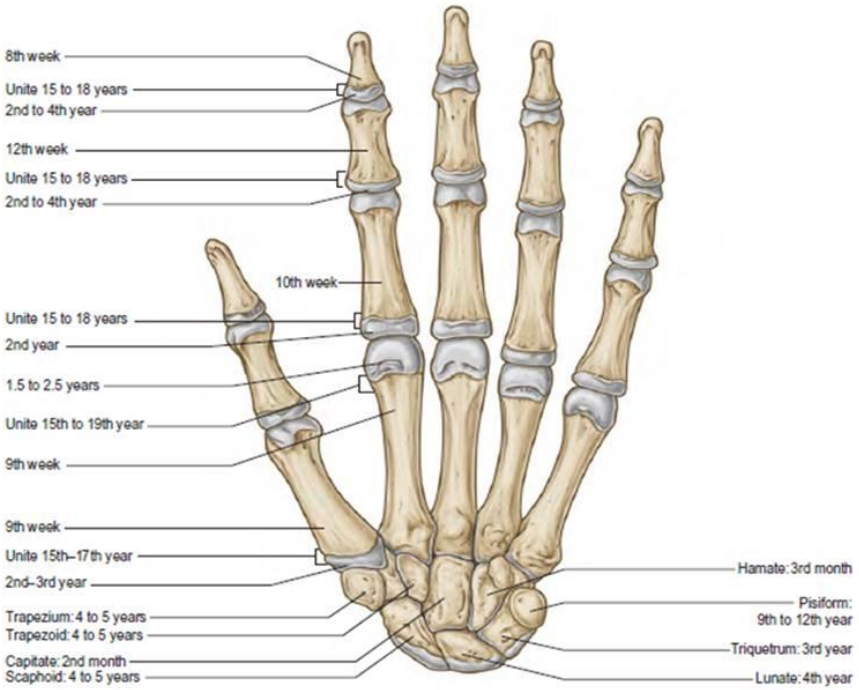


**Fig. 50.12** The bones of the hand of a child, indicating the general plan of ossification.